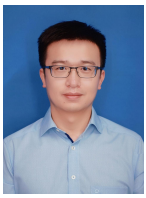
Formation and manipulation of optoacoustic mode-locking based on solid-core photonic crystal fibre

Russell Centre for Advanced Lightwave Science, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Science, China

Wenbin He
Email: hewenbin@siom.ac.cn

Harmonically mode-locked fiber laser based on stimulated Raman-like scattering in solid-core photonic crystal fibre provides an elegant mechanism for generation of GHz-rate ultrafast lasers as well as various highly-ordered multi-pulse states in a laser cavity. The unique harmonic mode-locking state based on such mechanism features self-organized patterns, self-stabilized pulse timing and self-adapted harmonic order, while the individual pulses have uncorrelated phase relations which allows for flexible manipulations through external control. In this talk I will give a review of the underlying mechanism of this scheme mainly in terms of the establishment of a time-domain optomechanical lattice resulted from the long-range interactions between intra-cavity pulse, while various manipulation schemes for the intra-cavity pulse sequences will also be presented.



Short Bio:

Wenbin He received his PhD degree in 2018 from Max Planck Institute for the Science of Light and Friedrich-Alexander University Erlangen-Nuremburg in Germany. In 2021 he joined Shanghai Institute of Optics and Fine Mechanics as a researcher. His research interests include nonlinear fibre optics and ultrafast fibre lasers.